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<u>L6</u>	('6697719')[ABPN1,NRPN,PN,TBAN,WKU]	2	<u>L6</u>
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L15: Entry 1 of 1

File: USPT

Oct 2, 2001

DOCUMENT-IDENTIFIER: US 6297731 B1

TITLE: Vehicle remote control system having keyless entry and piggyback control features and associated methods

Abstract Text (1):

A vehicle control system includes a data communications bus, a remote keyless entry (RKE) system, and a piggyback controller at the vehicle for performing a desired function based upon predetermined RKE signals generated on the data communications bus by the RKE controller. The RKE system may include an RKE transmitter to be carried by a user, an RKE receiver, and the RKE controller connected to the RKE receiver for generating the RKE signals on the data communications bus responsive to the RKE transmitter. An RKE actuator is connected to the bus for performing an RKE function. The piggyback controller permits the straightforward addition of one or more new remote control functions to a vehicle already including a remote keyless entry system and a data communications bus. The piggyback controller may comprise a piggyback alarm controller connected to at least one vehicle security sensor. The desired function may then be switching the piggyback alarm controller between an armed mode, capable of generating an alarm based upon the at least one vehicle security sensor, and a disarmed mode. In another advantageous embodiment of the invention, a remote start function can be piggybacked onto an existing RKE system.

Brief Summary Text (2):

The invention relates to the field of vehicle control systems, and, more particularly to vehicle remote control systems and related methods.

Brief Summary Text (9):

Implementing multiplexing concepts in vehicles in a cost-effective and reliable manner may not be easy. Successful implementation, for example, may require the development of low or error-free communications in what can be harsh vehicle environments. With multiplexing technology, the various electronic modules or devices may be linked by a single signal wire in a bus also containing a power wire, and one or more ground wires. Digital messages are communicated to all modules over the data communications bus. Each message may have one or more addresses associated with it so that the devices can recognize which messages to ignore and which messages to respond to or read.

Brief Summary Text (12):

Several standards have been proposed for vehicle multiplex networks including, for example, the Society of Automotive Engineers "Surface Vehicle Standard, Class B Data Communications Network Interface", SAE J1850, July 1995. Another report by the SAE is the "Surface Vehicle Information Report, Chrysler Sensor and Control (CSC) Bus Multiplexing Network for Class 'A' Applications", SAE J2058, July 1990. Many other networks are also being implemented or proposed for communications between vehicle devices and nodes or controllers.

Brief Summary Text (19):

These and other objects, features and advantages in accordance with the present invention are provided by a vehicle control system comprising a data communications bus, a remote keyless entry (RKE) system, and a piggyback remote controller at the vehicle for performing a desired piggyback control function based upon predetermined RKE signals generated on the data communications bus by the RKE controller. The RKE system may include an RKE transmitter to be carried by a user, an RKE receiver, the RKE controller connected to the RKE receiver for generating the RKE signals on the data communications bus responsive to the RKE transmitter, and at least one RKE actuator for performing an RKE function responsive to RKE signals. The piggyback controller permits the straightforward addition of one or more new remote control functions to a vehicle already including an RKE system and a data communications bus.

Brief Summary Text (20):

The vehicle control system may include at least one vehicle sensor connected to the piggyback controller. In one embodiment, the at least one vehicle sensor comprises at least one vehicle security sensor. Accordingly, in this embodiment the piggyback controller comprises a piggyback alarm controller connected to the at least one vehicle security sensor. The desired piggyback control function may then be switching the piggyback alarm controller between an armed mode, capable of generating an alarm based upon the at least one vehicle security sensor, and a disarmed mode.

Drawing Description Text (2):

FIG. 1 is a schematic block diagram of a vehicle control system including an RKE system and a piggyback alarm controller in accordance with the present invention.

Drawing Description Text (3):

FIG. 2 is a schematic block diagram of a vehicle control system including an RKE system and a piggyback remote start controller in accordance with the present invention.

Detailed Description Text (3):

Referring now initially to FIG. 1, a first embodiment of a vehicle control system 10 is now described. The system 10 includes a data communications bus 12, and a remote keyless entry (RKE) system connected thereto. More particularly, the RKE system includes an RKE transmitter 50 to be carried by a user, an RKE receiver 13 at the vehicle 11, and an RKE controller 14 connected to the RKE receiver for generating the RKE signals on the data communications bus 12.

Detailed Description Text (6):

A driver's door lock and unlock motor 16 is connected to the data bus 12, along with a passenger door lock and unlock motor 17 which would also operate the vehicle rear doors if the vehicle is so equipped. As will be readily appreciated by those skilled in the art, the driver's and passenger's door lock motors 16, 17 may be connected to the bus 12 and include their own respective bus transceivers, not shown. Alternately, the door lock motors 16, 17 may be connected to the bus 12 via an intervening common or shared interface module, not shown. The door lock motors 16, 17 provide RKE actuators.

Detailed Description Text (7):

As will also be appreciated by those skilled in the art, the RKE controller 14 may also monitor the bus 12 for other signals to determine if a door lock or unlock signal should be generated. For example, the RKE controller 14 may check to see whether the key 55 is in the ignition. In addition, the RKE controller 14 may also operate other actuators 20, either directly or via a separate bus interface, such as for the trunk release, for operating the vehicle horn (such as for a panic indication), and/or various internal or external vehicle lights as will be readily appreciated by those skilled in the art.

Detailed Description Text (9):

In the illustrated embodiment of FIG. 1, the vehicle control system 10 also includes at least one vehicle sensor 23 connected to the piggyback alarm controller 22. This connection may be either a hardwired connection through the hardwire input/output (I/O) interface 24 or via the data communications bus 12 as will be readily appreciated by those skilled in the art. Of course, in typical embodiments, multiple sensor inputs may be monitored, such as door, hood, and trunk switches, as well as shock or proximity sensors. The piggyback controller 22 may receive these signals via the data bus 12, via hardwire connections or via a combination of both.

Detailed Description Text (10):

Similarly, an alarm indicator 25, such as may be provided by siren, may also be connected either via the data communications bus 12 or directly to the hardwire I/O interface 24 as will also be appreciated by those skilled in the art. The alarm indicator 25 may also be the vehicle horn in other embodiments. In yet other embodiments, the alarm indicator 25 may be a radio transmitter to transmit the signal to a receiver carried by the user or monitored at a central station, for example, as will be readily appreciated by those skilled in the art.

Detailed Description Text (11):

The piggyback controller 22 also illustratively includes a central processing unit (CPU) 28 connected to the bus transceiver 26 and the hardwire I/O interface 24. A desired signal enabling means or portion 27 is illustratively connected to the CPU 28. The desired signal enabling means

27 will be further described in detail below. The CPU 28 performs the various logical control functions as described herein.

Detailed Description Text (12):

In the illustrated vehicle control system embodiment 10, the piggyback controller is a piggyback alarm controller 22. Accordingly, a desired function performed by the piggyback alarm controller 22 is switching between an armed mode, capable of generating an alarm based upon the at least one vehicle security sensor 23, and a disarmed mode.

Detailed Description Text (15):

Turning now to the control system 10' shown FIG. 2, this control system includes a remote start function that can, for example, be piggybacked onto an existing RKE system using the piggyback remote start controller 30. In other words, this embodiment of the vehicle control system 10' includes the schematically illustrated engine start circuit 31 connected to the piggyback remote start controller 30, and the desired function is activating the engine start circuit. At least one sensor 23' may also be used in this embodiment to ensure proper vehicle conditions before starting the engine. The other elements similar to those of FIG. 1 are indicated with a prime and need no further discussion herein.

Detailed Description Text (24):

Still another embodiment of the desired signal enabling means 27'" is explained with reference to FIG. 6. The desired signal enabling means 27'" includes a signal set memory 81 operatively connected to the schematically illustrated download learning means 84. The download learning means 84 may include an interface connected to the illustrated vehicle cellular telephone 86 to permit learning or downloading of the desired signal set from a remote or central monitoring and control station 88, for example. The desired signal set may also alternately be learned from the central station 88 through the satellite link provided by the satellite 110 and vehicle mounted satellite receiver 111 and associated antennas. As would be readily understood by those skilled in the art, the download learning means, as well as the other desired signal enabling means may be implemented by software in the CPU 28 of the piggyback alarm controller 22 or in a separate microprocessor or circuits.

CLAIMS:

1. A vehicle control system comprising:

a data communications bus at the vehicle;

at least one vehicle sensor;

a remote keyless entry (RKE) system comprising an RKE transmitter to be carried by a user, an RKE receiver at the vehicle, an RKE controller connected to said RKE receiver for generating RKE signals on said data communications bus responsive to said RKE transmitter, and at least one RKE actuator for performing an RKE function responsive to the RKE signals; and

a piggyback controller at the vehicle and connected to said data communications bus for performing a desired piggyback control function based upon predetermined RKE signals generated on said data communications bus by said RKE controller.

2. A vehicle control system according to claim 1 further comprising at least one vehicle sensor connected to said piggyback controller; and wherein said controller performs the desired piggyback control function also based upon the at least one vehicle sensor.

3. A vehicle control system according to claim 2 wherein said at least one vehicle sensor comprises at least one vehicle security sensor; wherein said piggyback controller comprises a piggyback alarm controller connected to said at least one vehicle security sensor; and wherein the desired piggyback control function is switching said piggyback alarm controller between an armed mode, capable of generating an alarm based upon said at least one vehicle security sensor, and a disarmed mode.

4. A vehicle control system according to claim 3 wherein the predetermined RKE signals comprise door lock and door unlock signals.

5. A vehicle control system according to claim 3 wherein the predetermined RKE signals comprise

driver's door unlock signals for switching to the disarmed mode.

6. A vehicle control system according to claim 1 wherein the vehicle comprises an engine start circuit; wherein said piggyback controller comprises a piggyback remote start controller connected to the engine start circuit; and wherein the desired piggyback control function is activating the engine start circuit.

7. A vehicle control system according to claim 6 further comprising at least one vehicle sensor connected to said piggyback remote start controller.

8. A vehicle control system according to claim 6 wherein the predetermined RKE signals comprise driver's door unlock signals for activating the engine start circuit.

9. A vehicle control system according to claim 1 wherein said piggyback controller comprises desired signal enabling means for permitting performance of the desired piggyback control function based upon predetermined RKE signals for a corresponding desired vehicle from a plurality of sets of RKE signals for different vehicles.

10. A vehicle control system according to claim 9 wherein said desired signal enabling means comprises:

a memory for storing a plurality of sets of RKE signals for different vehicles; and

a selector for selecting predetermined RKE signals from the plurality of different sets of RKE signals for different vehicles.

11. A vehicle control system according to claim 10 wherein said selector comprises a user selector for permitting a user to select the predetermined RKE signals.

12. A vehicle control system according to claim 9 wherein said desired signal enabling means comprises bus learning means for learning the predetermined RKE signals based upon RKE signals on the data communications bus.

13. A vehicle control system according to claim 9 wherein said desired signal enabling means comprises download learning means for learning the predetermined RKE signals from a downloading device.

14. A vehicle control system according to claim 1 wherein the predetermined RKE signals comprise at least one of door lock signals, door unlock signals, trunk release signals, light control signals, and horn control signals.

15. A vehicle control system according to claim 1 wherein the predetermined RKE signals comprise a predetermined pattern of at least one of door lock signals, door unlock signals, trunk release signals, light control signals, and horn control signals.

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